Space Weather Forecast

Issued on Monday, 05 June 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares (R1/Minor-R2/Moderate radio blackouts). Slight chance of G1/Minor storm due to CME effects 07-08 June.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, but with frequent Common-Class flares, with the peak flare occurring at 04/0345UTC from a region in the southeast disc. This is one of nine sunspot regions on the visible disc, and is the largest region, although it is relatively straightforward magnetically. Another large region rotating off the southwest limb has not shown signs of significant activity in the last 24 hours. A new region is emerging on the southeast limb and is still difficult to classify due to the viewing angle, but is showing some signs of complexity. The remaining regions are all smaller and simpler, but there are signs of further regions to rotate onto the east limb in the near future.

A large lift off occurred in the southwest quadrant around 04/0900UTC and gave a Coronal Mass Ejection (CME). Analysis is still ongoing, but it appears more likely to miss Earth, although a glancing blow is possible. No other Earth-directed CMEs were observed in available imagery during the period.

Solar Wind / Geomagnetic Activity: Solar winds have shown some disturbance, likely from a weak CME, or perhaps weak coronal hole effects. Wind speeds were slow, varying between 310-380 km/s. Total Interplanetary Magnetic Field has been at weak to moderate levels. The north-south component varied weakly at first but then varied moderately after 04/1000 UTC. Geomagnetic activity was mostly Quiet (Kp 1-2), with an Active (Kp 4) interval 04/1800-2100 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with a chance of Moderate-class flares and a slight chance of Strong flares. Whilst one larger region is rotating off the disc in the next 24 hours, it seems likely that further regions will rotate onto the east limb, keeping the flare probability flat through the next four days.

Solar Wind / Geomagnetic Activity: A CME erupted during the 04 June. This is currently thought more likely to miss Earth, however a glancing blow is possible either late on 07 June or early on 08 June. Two coronal holes both remain in a position where they could give a fast wind at Earth, however, wind speeds remain at slow-ambient levels. There remains the possibility of an increase in wind speeds, perhaps to slightly elevated levels, through Day 1 (05 June) although it now seems likely that any fast wind will be weak.

Geomagnetic activity is forecast to be mainly Quiet to Unsettled with a chance of Active intervals on Day 1 should we see fast wind effects. Activity then easing through Day 2 (06 June), with a possible increase late Day 3 into Day 4 (07-08 June) should we see any CME effects.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be at background levels with solar radiation storms unlikely to occur. However, there is a slight but declining chance of reaching the S1/Minor Storm threshold should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	10	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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